

**Treatment of Metal-Laden Hazardous Wastes with
Advanced Clean Coal Technology By-Products**

**Quarterly Report
September - December 1995**

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March 1996

Work Performed Under Contract No.: DE-FC21-94MC31175

For
U.S. Department of Energy
Office of Fossil Energy
Morgantown Energy Technology Center
Morgantown, West Virginia

By
University of Pittsburgh
1137 Benedum Hall
Pittsburgh, Pennsylvania 15261

MASTER

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EXECUTIVE SUMMARY

During the first quarter of Phase 2, work continued on evaluating Phase 1 samples, preparing reports and presentations, and addressing early details of the field work.

Phase 1 Sample Evaluation

Final analyses of TCLP extracts of Wastewater treatment Plant Soil, stabilized in the laboratory with the three by-products, confirmed the optimum treatment dosage of 50% for all three by-products.

Concretes were prepared from three treatment recipes that produced immediate stabilization. Measurement of compressive strengths to 90 days were completed for all eight concrete batches prepared in Phase 1 and the first quarter of Phase 2 for recipes that produced immediate stabilization. ASTM extractions were made of the cylinders broken at 90 days.

Compacted moistened samples were prepared from one additional treatment recipe of those indicated the potential for slow stabilization. Measurements of compressive strength to 90 days were completed for all three compacted samples prepared in Phase 1 and the first quarter of Phase 2. TCLP extractions were made of the cylinders broken at 28 and 90 days.

Reports and Presentations

The Center for Hazardous Materials Research completed the *Environmental Information Report for Phase Two: Treatment of Metal-Laden Hazardous Waste with Advanced Clean Coal Technology By-Products*.

The fourth quarterly technical report was submitted and work on the Topical Report proceeded toward its completion early in 1996.

A poster and an oral presentation were given at two internal symposia at the University of Pittsburgh and the preprint of a paper for presentation to the Fuel Chemistry Division of the American Chemical Society in late March 1996 was prepared.

Preparation for Field Work

Two requests were submitted by Mill Service, Inc., to the Pennsylvania Department of Environmental Protection (PADEP) for variances to permits to allow the field work to begin.

Plans for the Next Quarter

During the quarter from December 30, 1995 through March 30, 1996, work will continue on Tasks 3 through 7 of Phase 1, which remain uncompleted at the end of the current quarter. This will involve:

- attempting to identify a fourth by-product and another four wastes

- treating those wastes so identified with the three current by-products and the fourth one, if identified, in the laboratory
- completing the analysis of the laboratory data, including an economic examination, and including that analysis in the Topical Report.

Also during the next quarter, work will proceed on the Test Plan for Phase 2. The completion of the Test Plan will depend upon receipt of environmental approvals from PADEP and U.S.DOE.

INTRODUCTION

This fifth quarterly report describes work done during the fifth three-month period of the University of Pittsburgh's project on the "Treatment of Metal-Laden Hazardous Wastes with Advanced Clean Coal Technology By-Products."

Participating with the university on this project is Mill Service, Inc.

This report describes the activities of the project team during the reporting period. The principal work has focussed upon completing laboratory evaluation of samples produced during Phase 1, preparing reports and presentations, and seeking environmental approvals and variances to permits that will allow the field work to proceed.

LABORATORY AND FIELD WORK

Laboratory Analyses and Tests

During the period between the end of Phase 1 (August 18, 1995) and the end of the first quarter of Phase 2 (December 30, 1995), the following analyses and tests were carried out in the laboratories of the University of Pittsburgh.

Bench Scale Treatments of Sixth Hazardous Waste

Analysis of the bench scale treatments of the Wastewater Treatment Plant Soil with the three by-products was completed during the quarter. The work completed consisted of analyzing TCLP extracts of the bench scale treatments for the metal vanadium by graphite furnace AA. Analysis of this data, as well as the data obtained in the previous quarter, indicated that the optimum treatment level of this waste occurred at a dosage of 50% for each of the three by-products.

Stabilization/Solidification Evaluations

Several stabilization/solidification evaluations were conducted during the quarter. These included preparation of three mixtures from immediately successful treatments and preparation of two mixtures from treatments that did not prove immediately successful.

Immediate Stabilization

Three mixtures that demonstrated immediate stabilization were evaluated for solidification properties during the quarter. These evaluations consisted of treatments of the Wastewater Treatment Plant Soil with both the Tidd and the Ebensburg by-products and treatment of the Munitions Depot Soil with the Tidd by-product. In these evaluations, mixtures were prepared at a dosage of 50% by-product/waste with enough water to produce the desired 1.5-2.0" slump. Twenty-five 3" x 6" cylinders were prepared for each mixture and tested for compressive strength after curing for periods of 3, 7, 14, 28 and 90 days. A summary of the solidification tests prepared during the quarter using this methodology is given in Figure 1.

FIGURE 1: Summary of Solidification Tests Prepared For Immediate Stabilization

Test Date	Mixture Type	Weight By-Product (lbs)	Weight Waste (lbs)	Mixture Ratio	Water Added (liters)	Slump (inches)
8/15	Tidd/ Munitions Soil	22.5	45	5:10	4.0	1.5
9/19	Ebensburg/ WWTP Soil	25.5	51.0	5:10	6.0	1.75
9/19	Tidd/ WWTP Soil	25	50	5:10	3.75	1.5

The compressive strength of these mixtures, as well as compressive strengths after a curing time of 90 days of some of the mixtures prepared in the previous quarter were evaluated during this quarter. A summary of the compressive strengths of these mixtures are given in Figure 2.

FIGURE 2: Summary of Compressive Strength of Solidification Tests Prepared for Immediate Stabilization^{†‡§}

Curing Time (days)	CONSOL/Battery Sludge	Ebensburg/Munitions Soil	Tidd/Industrial Soil	CONSOL/Munitions Soil	Tidd/Battery Sludge	Tidd/Munitions Soil	Tidd/WWTP Soil	Ebensburg/WWTP Soil
3	---	29	39	---	35	21	---	---
7	---	295	82	---	61	41	32	71
14	---	433	153	---	138	55	71	519
28	---	494	217	27	178	143	134	652
90	46	341	378	29	270	188	364	539

[†] All strengths reported in units of pounds per square inch

[‡] All values in bold were collected during either the third or fourth quarter of Phase I

[§] Cells that do not contain values indicate that solidification sufficient to measure compressive strength had not yet occurred after the specified curing time

For each of the above mixtures, an ASTM water extraction was performed immediately after mixing in order to evaluate water leachable metals concentrations. In addition, following the 90-day curing time of each of these mixtures, a TCLP extraction was performed on each in order to confirm that the metals of concern remained stabilized. Work continued throughout the quarter analyzing the ASTM and TCLP extracts by atomic adsorption spectroscopy. A summary of the analysis completed on these samples is shown in Figures 3 and 4. It should be noted that all analysis for the metal barium was done by graphite furnace AA, instead of flame AA as originally stated in the test plan due to the low barium sensitivity encountered with flame AA.

FIGURE 3: Metal Analysis of ASTM Extracts of By-Product/Waste Mixtures Immediately After Mixing[†]

Metal	CONSOL/ Battery Sludge	Tidd/ Battery Sludge	CONSOL/ Munitions Soil	Tidd/ Munitions Soil	Ebensburg/ Munitions Soil	Tidd/ Indust. Soil	Tidd/ WWTP Soil	Ebensburg/ WWTP Soil
Barium	0.15	0.27	0.09	0.17	0.19	0.17	0.16	0.10
Cadmium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	3.6	1.3	<0.5	<0.5	0.6	0.5	<0.5	<0.5
Nickel	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Silver	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc	0.14	0.08	0.10	<0.05	0.07	<0.05	<0.05	<0.05

[†] All concentrations are in units of milligrams per liter

**FIGURE 4: Metal Analysis of TCLP Extracts of By-Product/Waste Mixtures
After 90-Day Curing Time[†]**

Metal	CONSOL/ Battery Sludge	Tidd/ Battery Sludge	CONSOL/ Munitions Soil	Tidd/ Munitions Soil	Ebensburg/ Munitions Soil	Tidd/ Industrial Soil
Cadmium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	<0.5	0.7	0.9	1.2	9.0	14.0
Nickel	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Silver	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc	0.4	0.20	5.60	0.23	3.20	1.10

[†] All concentrations are in units of milligrams per liter

Slow Stabilization

Several mixtures that did not undergo immediate stabilization were evaluated during the quarter for their ability to undergo solidification/stabilization given a reasonable curing time. These mixtures were prepared using the Proctor Method. Evaluations of a 50% mixture of the Tidd by-product and the Munitions Depot Soil and a 100% mixture of the CONSOL by-product and the Industrial Soil that were begun during the previous quarter were completed. In addition, a complete evaluation of a 50% mixture of the Ebensburg by-product and the Wastewater Treatment Plan Soil was conducted.

Work on the mixture of the CONSOL by-product and the Industrial Soil was performed mainly during the previous quarter, and work during this quarter consisted of evaluating the compressive strength and performing a TCLP extraction after the 90-day curing time of these mixtures. Samples of the Tidd/Munitions Depot Soil were prepared for compressive strength testing during this quarter and compressive strength was evaluated after curing times of 14, 28 and 90 days. Also, TCLP extracts of the mixture were prepared after curing times of 28 and 90 days.

A complete evaluation of the Ebensburg/Wastewater Treatment Plant mixture was performed during the quarter. This complete evaluation consisted of a sieve analysis, construction of the compaction curve, molding of 4" diameter compressive strength specimens at the optimum moisture content for compressive strength testing and preparation of a TCLP extraction after the 28-day curing time. The sieve analysis of the mixture is shown in Figure 5.

FIGURE 5: Sieve Analysis of Ebensburg/WWTP Soil Mixture

Sieve Size	Tare Weight (grams)	Weight Sieve + Material Retained (grams)	Weight Material Retained (grams)	% Retained	% Passing	Cumulative % Retained
3/8 inch	488	528	40	2.8	97.2	2.8
#4	522	604	82	5.7	91.5	8.5
#8	456	560	104	7.2	84.3	15.7
#16	503	686	183	12.7	71.6	28.4
#28	381	609	228	15.8	53.8	44.2
#50	459	757	298	20.7	35.2	64.8
#100	354	478	124	8.6	26.4	73.4
#180	437	647	210	14.6	12.0	88.0
Pan	290	463	173	12.0	0.0	100.0

The moisture-density data and the compaction curve illustrating the optimum moisture content of the mixture is shown in Figure 6.

FIGURE 6: Compaction Data and Compaction Curve of
Ebensburg/Wastewater Treatment Plant Proctor Mixture

UNIVERSITY OF PITTSBURGH

SOILS MECHANICS LABORATORY

COMPACTION TEST

Soil Sample Description Ebensburg / WWTP Soil Sample 5090

Location _____

Boring No. _____ Sample Depth _____

Sample No. _____ Test No. _____

Field Water Content 7.6 %

Specific Gravity _____

Date 9/25/95

Tested By J. Priddy

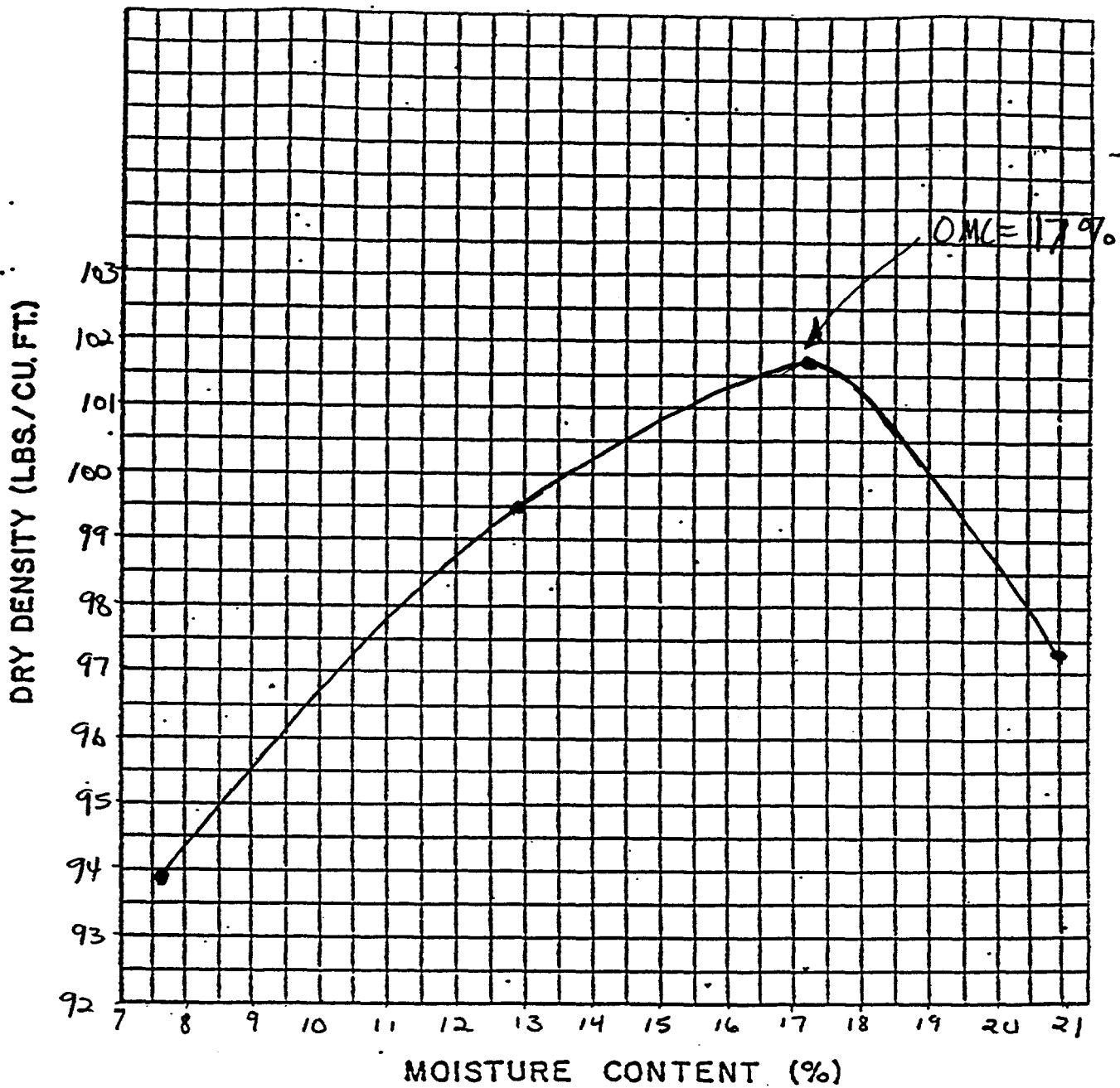
DENSITY

Determination No.	1	2	3	4	5
Wt. of mold + Comp. Soil (gm)	—	—	—	—	—
Weight of Mold (gm)	—	—	—	—	—
Weight of Compacted Soil (gm)	1626	1697	1802	1780	
Wet Density, γ (pcf)	100.9	112.2	119.2	117.7	
Dry Density, γ_d (pcf)	93.8	99.5	101.7	97.3	
Void Ratio, e					
Porosity, n					

WATER CONTENT

Determination No.	1	2	3	4	5
Container No.	4	30	24	26	
Weight of Container (gm)	2.6221	2.6071	2.6142	2.6052	
Weight of Container + Wet Soil	59.8560	54.2843	56.6351	56.7303	
Weight of Container + Dry Soil	55.7899	48.4176	48.7019	47.3197	
Weight of Water, W_w (gm)	4.0661	5.8667	7.9332	9.4106	
Weight of Dry Soil, W_s (gms)	53.1678	45.8105	46.0877	44.7145	
Water Content, w%	7.6	12.8	17.2	21.0	

FIGURE 6 (continued)



JOB: Ebensburg/WWTP Soil

DATE TESTED: 9/25/95

HOLE NO.	SAMPLE NO.	$w_n\%$	$w_{opt}\%$	γ_d (max)pcf	METHOD OF TESTING
	1	7.6		93.8	
	2	12.8		99.5	
	3	17.2		101.7	
	4	21.0		97.3	
			11		

Figure 7 summarizes the compressive strength of the three mixtures prepared for slow stabilization evaluation after the specified curing times.

FIGURE 7: Summary of Compressive Strength of Solidification Tests Prepared for Slow Stabilization[†]

Curing Time (days)	CONSOL/ Industrial Soil	Tidd/ Munitions Soil	Ebensburg/ WWTP Soil
14	101	59	166
28	106	60	110
90	109	98	88

[†] All strengths reported in units of pounds per square inch

Following the 28 and 90-day curing times of each of these mixtures, a TCLP extraction was prepared on each in order to determine if the metals of concern became stabilized. Work continued throughout the quarter analyzing the TCLP extracts by atomic adsorption spectroscopy. A summary of the analysis completed on these samples is shown in Figures 8 and 9.

**FIGURE 8: Metals Concentrations of By-Product/Waste Mixtures
Prepared By the Proctor Method After 28 Days of Curing[†]**

Metal	Tidd/ Munitions Soil	CONSOL/ Industrial Soil	Ebensburg/ WWTP Soil
Barium	0.42	2.18	0.40
Cadmium	<0.05	<0.05	<0.05
Chromium	<0.50	<0.50	<0.50
Lead	1.6	0.7	7.8
Nickel	<0.3	<0.3	<0.3
Silver	<0.05	<0.05	<0.05
Zinc	0.4	7.4	1.8

[†] All metals concentrations are in units of milligrams per liter

**FIGURE 9: Metals Concentrations of By-Product/Waste Mixtures
Prepared By the Proctor Method After 90 Days of Curing[†]**

Metal	Tidd/ Munitions Soil	CONSOL/ Industrial Soil	Ebensburg/ WWTP Soil
Cadmium	<0.05	<0.05	<0.05
Chromium	<0.50	<0.50	<0.50
Lead	1.3	0.8	0.5
Nickel	<0.3	<0.3	<0.3
Silver	<0.05	<0.05	<0.05
Zinc	0.5	8.64	0.6

[†] All metals concentrations are in units of milligrams per liter

Topical Report

These results are being included in the tables of the Topical Report which will issue in the next quarter.

Preparation for Field Work

On November 30, 1995 Mill Service, Inc. (MSI) wrote to Anthony D. Orlando, Pittsburgh Regional Manager for Waste Management of the Pennsylvania Department of Environmental Protection, requesting the Department's permission to conduct the Phase 2 field tests called for in this contract. MSI has requested a modification to its Hazardous Waste Permit to do so on a permanent basis, but has neither received the modification as yet nor has the expectation that it will be granted before the field work of Phase 2 must proceed.

MSI has also asked PADEP for an exemption from its Plan Approval/Operating Permit for an anticipated increase in fugitive emissions when clean coal technology by-products are used in Phase 2 to treat commercial hazardous waste batches at MSI's Yukon Plant.

Both the modification to the Hazardous Waste Permit and the exemption from the Plan Approval/Operating Permit are expected during the second quarter.

REPORTS AND PRESENTATIONS

Reports

On October 31, 1995 the Center for Hazardous Materials Research (CHMR) submitted the final document, *Environmental Information for Phase Two: Treatment of Metal-Laden Hazardous Wastes with Advanced Clean Coal Technology By-Products*. Three copies were provided to the Morgantown Energy Technology Center for its review and acceptance of the report. The Executive Summary of the report is reproduced in Appendix A. CHMR found that the field work in Phase 2 will create no significant environmental impacts at MSI's Yukon Plant. It did note, however, that MSI will file an air permit determination form to notify the Pennsylvania Department of Environmental Protection (PADEP) of the new treatment chemicals that will be used on the project. It also noted that MSI had filed for a modification of its hazardous waste permit to allow the use of the CCT by-products at the Yukon Plant.

On November 10, 1995 the Center for Energy Research of the University of Pittsburgh submitted the fourth quarterly technical report on the project to the Morgantown Energy Technology Center.

Work continued through the quarter on the Topical Report which will provide a comprehensive survey of the activity during Phase I.

Presentations

On November 8-9, 1995 the Materials Research Center of the University of Pittsburgh sponsored a conference on "Frontiers in Materials Science - 1995," its annual gathering of local specialists to review the center's activities for the previous year and to share insights on the trends in this field. Vourneen Clifford prepared and presented one of the fifty-one posters in the conference's poster session. The title of her poster was "Treatment of Metal-Laden Hazardous Wastes with Advanced Clean Coal Technology By-Products." Its authors were listed as James T. Cobb, Jr., Ronald D. Neufeld, Emanuel M. Schreiber, Jesse Pritts and B. Vourneen Clifford, and it described the activities conducted in Phase 1 of this project. The poster acknowledged the support of the U.S. Department of Energy.

On November 29, 1995 Jesse Pritts spoke to the seminar of the Environmental Engineering Program of the Civil and Environmental Engineering Department. The title of his presentation was "Treatment of Metal-Laden Hazardous Wastes with Advanced Clean Coal Technology By-Products" and it acknowledged the advice of Ronald D. Neufeld, James T. Cobb, Jr., and Emanuel M. Schreiber, the support of the U.S. Department of Energy and the participation of DLC, MSI and CHMR. In the presentation Mr. Pritts described the activities conducted in Phase 1 of this project.

On December 15, 1995 the Center for Energy Research submitted a preprint to the Fuel Chemistry Division of the American Chemical Society for the proceedings of its sessions at the ACS New Orleans Meeting on March 24-28, 1996. The paper, entitled "Stabilization of Metal-Laden Hazardous Wastes Using Lime-Containing Ash from Two FBCs and a Spray-Drier," will be presented as Paper #5 in Session #1 of the symposium on "Conversion of FGD Residues and Utility Fly Ash to Marketable Products."

OUTSIDE CONTACTS

Pittsburgh Coal Conference

James T. Cobb, Jr., and B. Vourneen Clifford attended the Twelfth Annual International Pittsburgh Coal Conference, sponsored by the University of Pittsburgh Center for Energy Research on September 11-15, 1995 at the Greentree Marriott, Greentree, Pennsylvania. Dr. Cobb served as co-chair of the Program Committee for the conference and Ms. Clifford served as a session aide.

Ash Utilization Symposium

James T. Cobb, Jr., attended the 1995 International Ash Utilization Symposium, sponsored by the University of Kentucky Center for Applied Energy Research and the Journal FUEL on October 23, 24 and 25, 1995 at the Hyatt Regency, Lexington, Kentucky.

Thermal Clean Systems

An inquiry was received early in the quarter from Thermal Clean Systems of Washington, Pennsylvania. Thermal Clean Systems is developing a waste treatment facility in southwestern Pennsylvania and wished to know about the project. Following completion of the fourth quarterly report in early December, pertinent portions of the four quarterly reports issued to that point were sent to this company, along with an offer to confer on items of mutual interest.

Concurrent Technologies Corporation

A written inquiry was received after hours at the poster session of the conference on "Frontiers in Materials Science - 1995" from Concurrent Technologies Corporation (CTC) of Johnstown, Pennsylvania. CTC had announced an interest in hazardous waste sorbent materials in the Commerce Business Daily's Weekly Release of October 6, 1995 through October 12, 1995. A telephone follow-up to the inquiry was made.

University of North Dakota Energy and Environmental Research Center

In response to a discussion at the Ash Utilization Symposium, David Hassett of the University of North Dakota Energy and Environmental Research Center sent a copy of an article from *Cement and Concrete Research* on "Thermodynamic Investigation of the $\text{CaO-Al}_2\text{O}_3\text{-CaSO}_4\text{-H}_2\text{O}$ System at 25°C and the Influence of Na_2O " by D. Damidot and F. P. Glasser (Vol. 23, pp. 221-238, 1993).

The PQ Corporation

On November 2, 1995 Ronald D. Neufeld and James T. Cobb, Jr., met with Michael K. Kovacs, Market Development Manager of The PQ Corporation to discuss areas of mutual interest. The PQ Corporation produces and markets soluble, powder and flake silicates. According to Bulletin 52-52 of The PQ Corporation, "Soluble silicates react with hazardous wastes to produce less hazardous substances by converting soluble metals into insoluble metal silicates and by encapsulating hazardous organic and inorganic components within an acid-resistant matrix. Soluble silicates also react with calcium-based stabilizers to produce a superior final product. Soluble silicates typically result in a strong, low permeability, chemically stabilized solid that is easy to handle, transport and landfill when used to treat a waste stream." The project team is considering including this product in its laboratory evaluations during Phase 2.

Dravo Lime Company

Joel Beeghly of Dravo Lime Company provided a news release from Ohio State University, dated July 27, 1995, announcing that "researchers at Ohio State University have found a way to immobilize lead-contaminated soil by covering affected areas with finely ground phosphate rocks. . . . The technology can also be used to treat soil contaminated with other heavy metals, such as zinc, aluminum, cadmium and possibly uranium." A synthetic compound, hydroxyapatite, made from phosphate rocks, quickly immobilizes lead. "When applied to the contaminated soil, hydroxyapatite breaks down into calcium and phosphate. The phosphate combines with the lead to form lead phosphate, which is insoluble and stable. As long as there is an excess amount of phosphate, the compound will not break down. . . . The researchers . . . found that [phosphate rocks applied directly on the contaminated soil] worked just as well and was cheaper to use than hydroxyapatite. . . . For alkaline soils . . . a liquid phosphate . . . might work better. . . . The research was published in a recent issue of *Environmental Science and Technology*."

ADMINISTRATIVE ASPECTS

This section provides the monthly highlights and then closes by comparing progress with the milestone chart.

Monthly Highlights

Here are the highlights of the first three months of the second phase of the project.

September 30 - October 30, 1995

- Note is made that the Pittsburgh Coal Conference was attended in early September 1995.
- Ash Utilization Symposium is attended.
- Contacts are made with Thermal Clean Systems and with the University of North Dakota Energy and Environmental Research Center.
- Laboratory analyses continue at the University of Pittsburgh on Phase 1 samples.

October 30 - November 30, 1995

- Environmental information report is received from CHMR.
- Fourth quarterly technical report issues.
- MSI files request to conduct Phase 2 field tests with PADEP.
- Poster is presented at "Frontiers in Materials Science - 1995" and a presentation is made to the seminar of the Environmental Engineering Program, both at the University of Pittsburgh.
- Preprint is submitted to the Fuel Chemistry Division of the American Chemical Society.
- Meeting is held with the PQ Corporation.
- Laboratory analyses continue at the University of Pittsburgh on Phase 1 samples.

November 30 - December 30, 1995

- Response is provided to Thermal Clean Systems.
- Laboratory analyses continue at the University of Pittsburgh on Phase 1 samples.

Comparison of Progress with Milestone Chart

The following task for Phase 2 was scheduled for completion during the first quarter of this second phase:

- Task 1 - Test Plan for Phase 2

Task 1 was not completed during this period. The required variances from permits were still being awaited at MSI and the review of the environmental information report had not been completed at METC.

By submitting the fourth quarterly technical report on November 10, 1995, the project team met one of its reporting requirements for this period.

Work continued on six tasks from Phase 1:

- Task 3 - Sample Collection and Characterization
- Task 4 - Treatment of Metal-Laden Waste with CCT Solid By-Product
- Task 5 - Data Analysis
- Task 6 - Economic Analysis
- Task 7 - Topical Report
- Task 8 - Information Required for the National Environmental Policy Act (NEPA)

Task 8 was completed on October 31, 1995.

The Topical Report, Task 7, which was due on October 18, 1995, has been delayed for several months because of uncertainty through mid-September over the final date of the end of Phase One and the magnitude of the effort. It is expected to be completed early in 1996.

During the month of uncertainty over the date of the end of Phase One, the pace of work on Tasks 5 and 6 also was slowed significantly. They will be substantially completed for inclusion in the Topical Report. As stated in the fourth quarterly technical progress report, laboratory treatments using the wastes and by-products in hand have been completed. The solidification studies based upon all eighteen possible waste/by-product

combinations are being conducted at a pace such that they will be fully completed by early in 1996. If and when the fourth by-product and the last four wastes are identified, laboratory evaluation of their use in stabilization and solidification will be conducted. Thus, the work on Task 4 is continuing into Phase 2.

The identification in Task 3 of the fourth by-product and of the final four wastes is continuing.

PLAN FOR THE NEXT QUARTER

During the quarter from December 30, 1995 through March 30, 1996, work will continue on Tasks 3 through 7 of Phase 1. The search for a fourth by-product will continue, focussing first upon the material used previously in another project by Dravo Lime Company. Mill Service, Inc. will watch for additional wastes to add to the list, particularly a paint sandblasting residue. Evaluation of the solidification of eleven combinations of wastes and by-products, begun in the fourth quarter of Phase 1, will conclude. The economic evaluation and the Topical Report will also be concluded.

Work on Task 1 of Phase 2 will continue. The Test Plan for Phase 2 will include the detailed plan for the field work and related laboratory activities scheduled to end on September 30, 1996.

APPENDIX A

EXECUTIVE SUMMARY

**ENVIRONMENTAL INFORMATION REPORT FOR
PHASE 2: TREATMENT OF METAL-LADEN HAZARDOUS WASTES
WITH ADVANCED CLEAN COAL TECHNOLOGY BY-PRODUCTS**

CENTER FOR HAZARDOUS MATERIALS RESEARCH

EXECUTIVE SUMMARY

The University of Pittsburgh Energy Resources Program has been awarded a contract from the U.S. Department of Energy (DOE) to evaluate the effectiveness of using by-products from advanced sulfur removal systems to treat metal-laden characteristic hazardous wastes. The Center for Hazardous Materials Research (CHMR) has been subcontracted by the University of Pittsburgh to provide the environmental information needed for DOE to make an environmental review determination pursuant to DOE's Implementing Procedures (10 CFR 1021, Subpart B) under the National Environmental Policy Act (NEPA).

This environmental information report is supplemented by the completed DOE Morgantown Energy Technology Center (METC) Environmental Questionnaire included in Appendix A. The DOE METC Environmental Questionnaire is used by DOE to determine the level of NEPA review required. This environmental information report extends the scope of the questionnaire, which is often used as a basis for a Categorical Exclusion determination, to include topics typically addressed in an Environmental Assessment.

This report includes project information, including a description of the proposed action, project and report objectives, estimated project schedule, and proposed action location and facilities. Potential environmental impacts and environmental compliance issues are discussed. A summary of the permits obtained by the Mill Service, Inc. (MSI) Yukon Plant facility, the location of the proposed demonstration, and any other permits required to conduct the Phase Two demonstration project are provided. Finally, a summary of the existing characteristics of the proposed action site and potential environmental impacts is included.

Major findings of CHMR's review include the following:

- There will be no new land use impacts to the region. Similarly, existing aesthetic views at the Yukon Plant site will not be affected by the proposed action.
- The proposed action would have negligible air quality impacts on the Yukon Plant site and surrounding area.
- The Yukon Plant site currently meets air quality permit requirements for commercial operations at the site. A permit determination form will be

filed by MSI to notify the Pennsylvania Department of Environmental Protection (PADEP) that a new material will be used to treat hazardous waste.

- The proposed project activities will not impact a floodplain or wetland.
- Any wastewater generated from the proposed project would be reused and/or discharged under MSI's current National Pollutant Discharge Elimination System (NPDES) permit. No additional permits are required.
- The Yukon Plant currently follows and would continue to follow during the proposed demonstration solid and hazardous waste management procedures as required under the Resource Conservation and Recovery Act (RCRA). A permit modification to allow MSI to treat metal-laden hazardous waste using stabilization and solidification has been filed with PADEP.
- The proposed action does not have the potential to significantly affect plant or animal species or their habitats, endangered (or threatened) plant or animal species, or migratory condors.
- The proposed action would not affect any archaeological or historic resources.
- No effects on local population, the transportation system, public services, property values, or energy resources are expected.
- There are no impacts anticipated on public services, property values, or energy resources as a result of the proposed action.
- The MSI Yukon Plant's Health and Safety Plan (overall site and operations) and Chemical Hygiene Plan (laboratory) requirements address the Occupational Safety and Health Administration and Environmental Protection Agency requirements for the site's current commercial operations. No new worker health and safety issues are anticipated to result from conducting the proposed action.